REMARKS

Claims 2 and 4-20 are pending in this application, with claims 4-19 currently withdrawn from consideration. Claim 3 has been canceled without prejudice or disclaimer. Claims 2 and 20 have been amended herein. No new matter has been added by this amendment.

Claims 2 and 20 are objected to because of informalities (Office action paragraph no. 5).

The objection is overcome by the amendments to claims 2 and 20, which have been made for clarity. The claims were objected to over the recitation of "its oxide". In the amendment to claim 2, the claim has been amended: "... Ru (ruthenium), Rh (rhodium), Ir (iridium), Os (osmium), ~~and~~ Re (rhenium) and ~~its oxide~~ the oxides of Ru, Rh, Ir, Os and Re." This amendment clarifies that the conductive film can contain Ru, Rh, Ir, Os, or Re, or an oxide of any of these metals. The corresponding amendment has been made to claim 20.

Claim 20 is objected to because of informalities (Office action paragraph no. 6).

The objection in point (a) is overcome by the amendment to claim 20. The claim has been amended as suggested by the Examiner to recite: "said second conductive film is formed of a laminated film".

The objection in point (b) is respectfully traversed. Applicants have retained the recitation "any one of a TiN film and a laminate film formed of a Ti film and a TiN film on said Ti film"

because the TiN film needs to be arranged on a Ti film.

Claim 3 is rejected under 35 U.S.C. 102(e) as being anticipated by Arai et al. (U.S. 2001/0041268) (Office action paragraph no. 8).

The rejection is moot in view of the cancellation of claim 3 without prejudice or disclaimer.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamano et al. (U.S. Patent No. 5,811,834) (Office action paragraph no. 10).

The rejection is moot in view of the cancellation of claim 3 without prejudice or disclaimer.

The rejection of claim 2 is respectfully traversed, and reconsideration of the rejection is respectfully requested.

The cathode of amended claim 2 consists of the first conductive film that contains an alkaline metal or an alkaline earth metal and the second conductive film that is arranged on the first conductive film and contains any one of the metals selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os, Re. In the invention of claim 2, the second conductive film is prepared in order to prevent oxidization of the first conductive film, which is easy to oxidize. The second conductive film prevents entry of oxygen into the first conductive film by means of the contained metal of Ru, Rh, Ir, Os, or Re, or the oxide of Ru, Rh, Ir, Os, or Re. Applicants note that the metals Ru, Rh, Ir, Os, and Re have conductivity even if the metals are oxidized. Consequently, the second conductive film can be used for a long time as the conductive film for protecting the first

conductive film.

On the other hand, in the cathode of Tamano et al. (U.S. 5,811,834), the alkaline metal, the alkaline earth metal, Ru, etc., are used as a conductive material. However, in Tamano et al., **only the material of a single conductive film**, i.e., the alkaline metal, the alkaline earth metal, Ru, etc. is disclosed, and a protective and conductive film (the second conductive film) is **not** disclosed.

Applicants note that there is no suggestion of a problem of oxidization of the cathode in Tamano et al., and therefore no suggestion or motivation to provide a film to prevent oxidation.

In addition, in column 24, lines 47-48 of Tamano et al., it is shown that the cathode may be formed of two layers or more. Again, in Tamano et al., since there is no suggestion to solve a problem of oxidization of the cathode, when the cathode is formed of two layers, there is no disclosure of conductive materials to be used for a protective and conductive film.

Applicants therefore assert that claim 2 is novel and non-obvious over Tamano et al.

Claim 20 is rejected under 35 U.S.C.103(a) as being unpatentable over Tamano et al. (U.S. Patent No. 5,811,834) in view of Arai et al. (U.S. 2001/0041268) (Office action paragraph no. 11).

The rejection of claim 20 is respectfully traversed, and reconsideration of the rejection is respectfully requested.

The cathode of amended claim 20 consists of the first conductive film that contains an alkaline metal or an alkaline earth metal and the second conductive film that is arranged on the first

conductive film and has a laminated structure, as recited. The second conductive film consists of the first layer that contains any one of the metals selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os, Re, and the second layer that is formed of a TiN film or a TiN/Ti film. In the invention of claim 20, the second conductive film is prepared in order to prevent oxidization of the first conductive film, which is easy to oxidize.

The first layer of the second conductive film can be used for a long time as the protective and conductive film since the first layer prevents from entering of the oxygen into the layer under the first layer by the metals of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os, and Re, and the metals of Ru, Rh, Ir, Os, and Re have conductivity even if the metals are oxidized.

The second layer of the second conductive film can be used for a long time as the protective and conductive film since TiN film and TiN/Ti film have barrier characteristics to oxygen and hardly degrade even if exposed to the oxygen.

Thus, in the invention of claim 20, since the second conductive film consists of two layers wherein each layer can prevent entry of the oxygen and can continue maintaining conductivity for a long time, oxidization of the first conductive film can be strongly prevented.

On the other hand, in the cathode of Tamano et al. (US 5,811,834), there is no protective and conductive film (the second conductive film) for preventing oxidization of the cathode.

And, in the cathode of Arai et al. (US 2001/0041268), the protective electrode (the second conductive film) is prepared in order to protect the electron injecting electrode (the first conductive film) that is formed of an alkaline metal, an alkaline earth metal, etc., from oxygen. However, the

protective electrode consists **only** of the film formed of the TiN film, etc. In other words, the protective electrode in Arai et al. **does not have the two-layer structure recited in claim 20**: a laminated film consisting of the layer that contains any one of the metal selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os, Re, and the layer that is formed of the TiN film or the TiN/Ti film.

In the Examiner's proposed modification of the references, Arai et al.'s protective electrode is added over the cathode of Tamano et al.. However, Applicants submit that addition of the protective electrode of Arai to the cathode of Tamano et al. does not result in the cathode of claim 20. Moreover, such a modification of Tamano et al. would not strongly prevent oxidization of the cathode.

In addition, in Tamano et al., it is shown that the alkaline metal, the alkaline earth metal, Ru, etc., are used as a conductive material of the cathode and the cathode may be formed of two layers or more. However, in Tamano et al., since there is no suggestion of a problem of oxidization of the cathode, there is no disclosure regarding which conductive material should be arranged in the upper layer and the lower layer when the cathode is constituted of two layers. Therefore, there is no suggestion or motivation in the reference for a cathode made by combining the film containing the alkaline metal or the alkaline earth metal and the film containing Ru, and being arranged with the film containing Ru on the film containing the alkaline metal or the alkaline earth metal.

Applicants therefore submit that claim 20 is novel and non-obvious over Tamano et al. and Arai et al., taken separately or in combination.

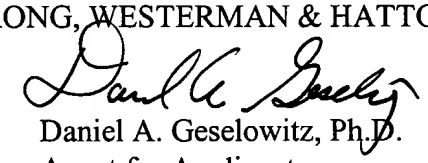
Reconsideration of the rejections and objections is therefore respectfully requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



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